

RESTRICTION OF THE CHIRIDOTID GENUS *TROCHODOTA* LUDWIG (1891) (HOLOTHURIOIDEA: APODIDA), WITH THE DESCRIPTION OF A NEW SPECIES FROM SOUTH AUSTRALIA

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Summary

Rowe, F. W. E. (1976).—Restriction of the chiridotid genus *Trochodota* Ludwig (1891) (Holothurioidea: Apodida), with the description of a new species from South Australia. *Trans. R. Soc. S. Aust.* **100**(4), 203-206, 30 November, 1976.

Trochodota Ludwig (1891) is restricted to the type-species *T. purpurea* (Lesson), and three other species, including a new species from South Australia. The generic significance of scattered or heaped wheels, used in separating *Trochodota* from *Taeniogyrus* Semper, 1868, is disputed. The distribution of serrations on the inner margin of the wheels is regarded a more reliable generic character; on this basis seven species included in *Trochodota* by H. L. Clark (1921) and subsequent authors are referred to *Taeniogyrus*.

Introduction

Among the holothurians collected at Port Lincoln, South Australia during 1975 by Mr S. A. Shepherd are six belonging to an undescribed species congeneric with *Trochodota purpurea* (Lesson), type-species of *Trochodota* Ludwig (1891).

In one important character, the new species falls into an intermediate position between the genera *Trochodota* and *Taeniogyrus* Semper (1868), as currently diagnosed (H. L. Clark 1921; Pawson 1964). A review of the two genera has revealed that they are not based upon reliable characters; in this paper they are redescribed and a list of species given for each.

It is not appropriate to discuss in this paper the validity of all species now included in *Taeniogyrus*, since many species require re-examination and material is not available: H. L. Clark (1921); Pawson (1964). However, the differences between the four well documented species in *Trochodota*, including the new species described below, are tabulated.

Taxonomic account

H. L. Clark (1921), revising the chiridotid genera, separated *Taeniogyrus* Semper (1868) and *Trochodota* Ludwig (1891) from other genera, because they possess a combination of wheel and sigmoid ossicles. On the basis of having the wheel ossicles actually collected into

sharply defined papillae of the body wall, *Taeniogyrus* was considered generically distinct from *Trochodota*. Small accumulations of wheels were considered indicative of *Trochodota*. Subsequent authors have rigidly adhered to this recognition of the two genera (A. M. Clark 1966; Hickman 1962; Pawson 1964, 1970; Heding 1928; Cherbonnier 1952). Although several new species of *Taeniogyrus* have been described since 1921, no new species of *Trochodota* have been found.

With the arrangement of wheels in large groups, though not in papillae, the new species described below falls into an intermediate position between *Taeniogyrus* and *Trochodota*. In my view, this shows the unreliability of using such a character for generic distinctions, particularly when H. L. Clark (1921) used the similar grouping of sigmoid ossicles for species determinations. A difficulty then arises in deciding the relative merits of the importance of wheels versus sigmoid ossicles in the recognition of the generic taxa, for which no sound argument has so far been advanced. One character which does so easily distinguish *T. purpurea*, *T. allani*, *T. maculata* and the new species not only from those in *Taeniogyrus*, is the arrangement of the serrations on the inner margin of the wheels. In the absence of any other reliable internal or skeletal character, I believe that this is a much more significant

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character on which to place generic weight. It also accords with the use of spicule form in the recognition of generic taxa within other orders of holothurians (Panning 1949; Rowe 1969).

Trochodota is herein restricted to that discrete group of species with serrations of the inner rim of the wheels arranged in groups. The remaining seven species included by H. L. Clark (1921) in *Trochodota* are referred to *Taeniogyrus*.

Trochodota is now considered to be restricted to the southern hemisphere, with representative species ranging from the colder waters of the southern tip of South America to the more temperate waters of southeastern Australia, including Tasmania, and the tropical waters of the Torres Strait between Papua New Guinea and the northeastern tip of Australia. The genus is found from shore-line to depths of about 50 m.

Taeniogyrus Semper, 1868

Taeniogyrus Semper 1868: 23.

?*Sigmodota* Studer 1876: 454.

?*Trochodota* Ludwig 1891: 358 (part).

Diagnosis: Chiridotid genus with wheels and sigmoid ossicles present, scattered, or in groups or clustered into papillae; wheels with serrations continuous around the inner margin; tentacles 10 or 12.

Type-species: *Chiridota australianus* Stimpson 1856.

Other species: *T. contortus* (Ludwig 1874); *T. cidaridis* Oshima 1915; *T. dubius* H. L. Clark 1921; *T. kelensis* Heding 1928; *T. clarus* Heding 1928; *T. dumedinensis* (Parker 1881); *T. diasema* (H. L. Clark 1921); *T. roebucki* (Joshua 1914); *T. rosea* (Oshima 1914); *T. japonica* (von Marenzeller 1881); *T. dendyi* (Mortensen 1925); *T. dayi* (Cherbonnier 1952); ?*T. venusta* Semon 1887.

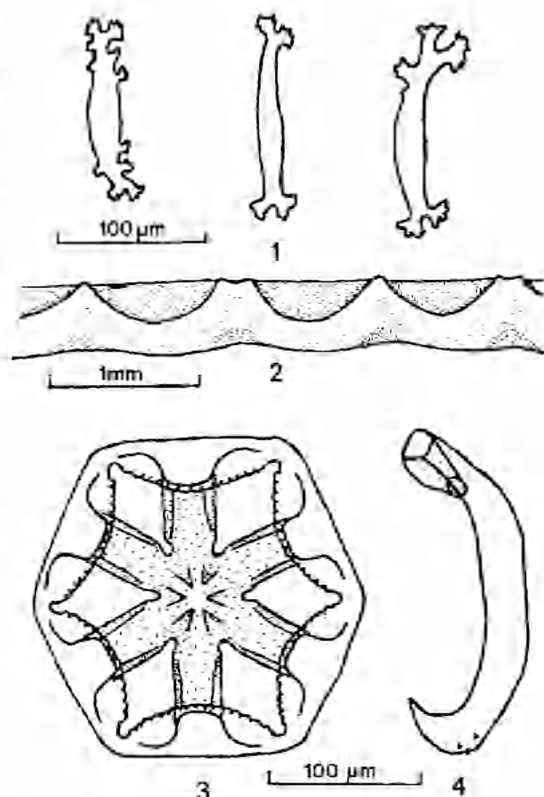
Trochodota Ludwig, 1891

Trochodota Ludwig 1891: 358 (part).

Diagnosis: Chiridotid genus with wheels and sigmoid ossicles present scattered or in groups, wheels with serrations on the inner margin in well defined groups; tentacles 10.

Type-species: *Holothuria (Fistularia) purpurea* Lesson 1830.

Other species: *T. allani* (Joshua 1912); *T. maculata* H. L. Clark 1921; *T. shepherdii* n. sp.



Figs 1-4. *Trochodota shepherdii* n.sp. Fig. 1—Tentacle rods; Fig. 2—Two radial and two interradial plates of the calcareous ring; Fig. 3—Wheel ossicle; Fig. 4—Sigmoid ossicle.

Trochodota shepherdii n. sp.

T. allani, Joshua & Creed, 1915: 21 (non *T. allani* Joshua).

Types: Holotype (Australian Museum J9467) and 5 paratypes J9796 (2) J9797 (1); South Australian Museum K1366 (2); Proper Bay, Port Lincoln, Spencer Gulf, S. Aust., among algae growing on *Pinna dolobrata* at 10 m depth. Collected by S. A. Shepherd, 23.viii.1975.

Diagnosis: Large spicules, wheels 55–226 µm diameter; serrations on inner margin of wheels in 6 groups of about 16; sigmoid ossicles 144–190 µm long, outer curve of hook of sigmoid ossicle with minute thorns; colour in life, black.

Description of holotype (which has been dissected): The holotype is 60 mm long, of which the anterior 20 mm is contracted. Body diameter 5–8 mm along its length, tapering only at the posterior end. Ten strongly contracted tentacles, each with about 3 pairs of digits.

TABLE 1
Differences between species of Trochodota

Species	Sigmoid ossicles			Wheel ossicles		Colour	Distribution
	Grouping	Hook	Length	Grouping	Diameter		
<i>maculata</i>	in papillae and scattered	smooth	66-77 μm	scattered	50-100 μm	pink with darker spots	Torres Strait, Qld
<i>allani</i>	scattered perpendicular to longitudinal body axis	smooth	120-150 μm	scattered singly or at most in small groups of 5-6	33-216 μm	purple	Port Phillip, Vic.—S.E. Tas.
<i>purpurea</i>	scattered	smooth	125-150 μm	scattered	154-182 μm	purple	Southern Ocean, Falkland Island southern coast of South America
<i>shepherdi</i>	scattered perpendicular to longitudinal body axis	with thorns	144-190 μm	discrete, large groups (not in papillae) arranged uniserially along each inter-radius	84-216 μm	black	Port Lincoln and Kangaroo I., S. Aust.

Spicules in tentacles comprise slightly curved rods dichotomously branched at each end, and usually have a series of thorny knobs projecting laterally along shaft (Fig. 1).

Calcareous ring comprises 10 pieces fused, with a straight anterior and a slightly undulating posterior margin. Radial pieces each have a small anterior notch. Each piece of the ring is 1 mm x 0.5 mm (Fig. 2).

There is one ventral polian vesicle and the dorsally placed madreporite is very small and hook-shaped (0.5 mm x 0.25 mm).

Long, unbranched gonad on either side of the dorsal mesentery, joined anteriorly to a single, dorsal gonoduct. Gonads extend for about two-thirds of the body length and are packed with eggs.

Ciliated funnels numerous: on either side at base of dorsal mesentery in mid-dorsal inter-radius in mid-interradial line of interradius adjacent to, and to left of mid-dorsal interradius, and in ventral interradius directly opposite to those two dorsal interradia. Body wall translucent; radial muscles, lines of ciliated funnels, and outline of internal organs can be seen through it.

Calcareous spicules of body wall comprise wheels and sigmoid ossicles. Wheels restricted to discrete groups but not accumulated into papillae. These groups form a single line along

each of the interradia, except in the posterior 1/3 of body where the groups possess smaller numbers of wheels, and form two irregular lines per interradius. Wheels have six spokes. Inner margin of each wheel has six discrete groups of about 16 serrations (Fig. 3). Wheels are 55 μm –226 μm in diameter. Sigmoid ossicles evenly scattered throughout the body wall and lie perpendicular to longitudinal axis of body. Shaft of each is smooth except that on the outside curve, at the attenuated hook end, there are 2–4 minute spines or thorns (Fig. 4). The sigmoid ossicles are 144–190 μm in length.

The animal in life is black. Besides the holotype 5 other specimens, similar in all respects, were collected and these are considered as paratypes.

Distribution: Port Lincoln, Spencer Gulf and Kangaroo Island, South Australia.

Etymology: The species is named after the collector, Mr Scoresby A. Shepherd.

Remarks: Differences between *T. shepherdi*, *T. maculata*, *T. allani* and *T. purpurea* are listed in Table 1.

Acknowledgments

I would like to thank Mr S. A. Shepherd (Department of Fisheries, South Australia) for forwarding material of the new species to me

for examination; Dr B. J. Smith, National Museum of Victoria; and Mr W. Zeidler, South Australian Museum, for allowing me to examine remaining slides and specimens of *T. allani* and *T. roebucki* described or examined by Joshua (1912, 1914).

References

- CHERBONNIER, G. (1952).—Contribution à la connaissance des Holothuries de l'Afrique du Sud. *Trans. R. Soc. S. Afr.* **33**(4), 469-509, pls XXXV-L.
- CLARK, A. M. (1966).—Echinodermata. Port Phillip Survey. *Mem. natn. Mus. Vict.* **27**, 289-384, pls i-iv.
- CLARK, H. L. (1921).—The echinoderm fauna of Torres Strait. *Pap. Dep. mar. biol. Carnegie Instn. Wash.* **10**, 1-223, pls 1-38.
- HEDING, S. G. (1928).—Synaptidae. *Vidensk. Meddr dansk naturh. Foren.* **85**, 105-323, 69 figs, pls 2-3.
- HICKMAN, V. V. (1962).—Tasmanian sea-cucumbers (Holothuroidea). *Pap. Proc. R. Soc. Tasm.* **96**, 49-72, figs 1-177, 2 pls.
- JOSHUA, E. C. (1912).—On a new holothurian of the genus *Taeniogyrus* found in Port Phillip Bay. *Proc. R. Soc. Vict. (n.s.)* **25**, 79-81, pls iii-iv.
- JOSHUA, E. C. (1914).—Victorian Holothuroidea with descriptions of new species. *Proc. R. Soc. Vict. (n.s.)* **27**(1), 1-11, pl. 1.
- JOSHUA, E. C. & CREED, E. (1915).—South Australian Holothuroidea, with descriptions of new species. *Trans. R. Soc. S. Aust.* **39**, 16-24, 3 pls.
- LUDWIG, H. (1889-1892).—Echinodermen (Stachelhautre). 1. Buch. Die Seewalzen. In Bronn, H. G. Klassen und Ordnungen des Thier-Reiches. Leipzig **2**(3), 1-447, 25 figs, 17 pls, 12 maps.
- MORTENSEN, T. (1925).—Echinoderms from New Zealand and the Auckland-Campbell Islands. III Asteroidea, Holothuroidea and Crinoidea. *Vidensk. Medd. naturh. Foren. Kbh.* **79**, 263-420, 70 figs, 3 pls.
- PANNING, A. (1949).—Versuch einer Neuordnung der Familie Cucumariidae (Holothuroidea, Dendrochirota). *Zool. Jb.*, **78**, 404-470, 62 figs.
- PAWSON, D. L. (1964).—The Holothuroidea collected by the Royal Society Expedition to Southern Chile, 1958-59. *Pac. Sci.* **18**(4), 453-470, 3 figs.
- PAWSON, D. L. (1970).—The marine fauna of New Zealand: Sea cucumbers (Echinodermata: Holothuroidea). *Bull. N.Z. Dep. scient. ind. Res.* **201**, 7-69, 10 figs, 2 pls.
- ROWE, F. W. E. (1969).—A review of the family Holothuriidae (Holothuroidea: Aspidochirotida). *Bull. Br. Mus. nat. Hist. (Zool.)* **18**(4), 117-170, 21 figs.
- SEMPER, C. (1868).—Die Holothurien. *Reisen im Archipel der Philippinen*. Weisbaden **1**, 228 pp., 60 pls.